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Specific features of the phase transition of gibbsite into boehmite under hydrothermal treatment of floccules in an aqueous suspension

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Abstract

© 2015 Pleiades Publishing, Ltd. Effect of the conditions in which floccules of gibbsite are hydrothermally treated on the phase composition of products of its dehydration products, obtained at T = 180-210°C and P = 1.0-1.9 MPa was studied. The phase transition of gibbsite into boehmite occurs by the dissolution-deposition mechanism upon delamination of gibbsite crystals along the (001) plane to give a multitude of layers with thicknesses of 20-100 nm and cracks in between, with widths of 10-50 nm. In the dissolution of gibbsite, $[Al(OH)4]^-$ anions pass into solution and react with protons of hydroxy groups on the (001) planes of gibbsite, with the subsequent nucleation of boehmite and growth of its crystals. The crystallization of coarse boehmite particles favors formation of nonporous floccules. Boehmite particles form no strong crystallization bonds with each other, which impairs their abrasion resistance.

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